

## Full Stack Development Laboratory 03

**Name - Shounak Dighe**

**Roll No - 20**

**Pannel - H**

**Prn - 1032233107**

**Aim: Client-side Form Validations using JavaScript, DOM real-time update, JQuery to develop Ajax based applications.**

**Aim:** Write a program to perform following form validations using JavaScript:

- a) All fields mandatory,
  - b) Phone number, Email Address, Zip code Validation etc.
- Include JavaScript to access and manipulate Document Object Model (DOM) objects in an HTML web page.
- Include JQuery to develop to develop your application as an Ajax based application.

### Objectives:

1. To understand what is form validation.
2. To learn basic functioning of DOM objects.
3. To learn how to apply various techniques to implement it.

### Theory:

#### 1. Different Types of Form Validations

Form validation is a critical process to ensure the data submitted by users meets the required standards and is accurate. Validation can be performed in several ways:

- **Client-Side Validation:**
  - **HTML5 Validation:** Utilizes built-in HTML5 attributes such as **required**, **pattern**, **min**, **max**, and **type**. For example, `<input type="email" required>` ensures the input is a valid email address.
  - **JavaScript Validation:** Custom validation scripts written in JavaScript or jQuery can check for specific conditions, provide instant feedback, and handle complex validation rules.
- **Server-Side Validation:**
  - **Backend Checks:** Performed on the server to ensure that the submitted data is accurate and secure, regardless of the client-side validation. It is crucial for security as client-side validation can be bypassed.
- **Combination of Both:** Often, a combination of client-side and server-side validation is used to provide immediate feedback to users while ensuring data integrity on the server.

#### 2. HTML Document Object Model (DOM)

The HTML Document Object Model (DOM) is a programming interface for web documents. It represents the structure of a document as a tree of objects, each representing a part of the document.

- **Document Object:** Represents the entire HTML document.
- **Element Objects:** Represent HTML tags like `<div>`, `<p>`, etc.
- **Attribute Nodes:** Represent the attributes of HTML tags, such as `id` or `class`.
- **Text Nodes:** Represent the text inside HTML elements.

Using the DOM, you can manipulate the document structure, style, and content dynamically with programming languages like JavaScript.

### 3. What is jQuery?

jQuery is a fast, lightweight, and feature-rich JavaScript library. It simplifies HTML document traversal and manipulation, event handling, and animation. It also provides utilities for making AJAX requests.

#### Key Features of jQuery:

- **DOM Manipulation:** Easily select and manipulate HTML elements.
- **Event Handling:** Simplify event handling such as clicks and form submissions.
- **AJAX Support:** Facilitate asynchronous web requests.
- **Animations:** Provide methods for creating animations and effects.

#### Various jQuery Selectors:

- **Basic Selector:** `$('selector')` – Selects elements based on their tag name, class, or id.
  - Example: `$('p')` selects all `<p>` elements.
- **ID Selector:** `$('#id')` – Selects an element by its ID.
  - Example: `$('#myId')` selects the element with `id="myId"`.
- **Class Selector:** `$('.class')` – Selects elements by their class.
  - Example: `$('.myClass')` selects all elements with `class="myClass"`.
- **Attribute Selector:** `$('[attribute=value]')` – Selects elements with a specific attribute value.
  - Example: `$('[type="text"]')` selects all elements with `type="text"`.
- **Descendant Selector:** `$('ancestor descendant')` – Selects elements that are descendants of a specified ancestor.
  - Example: `$('div p')` selects all `<p>` elements inside `<div>` elements.
- **Child Selector:** `$('parent > child')` – Selects direct child elements.
  - Example: `$('ul > li')` selects all `<li>` elements that are direct children of `<ul>`.
- **Pseudo-Class Selector:** `$('selector:pseudo-class')` – Selects elements based on a pseudo-class.
  - Example: `$('a:hover')` selects `<a>` elements when hovered.

## FAQ:

### 1. Write 3 Reasons Why Form Validations are Important.

1. **Data Accuracy:** Validations ensure that users provide the correct format and type of data, reducing errors and ensuring the data is usable and accurate.
2. **Security:** Proper validation helps prevent malicious inputs such as SQL injection or cross-site scripting (XSS) attacks by filtering out harmful data.
3. **User Experience:** Immediate feedback through validation helps users correct errors before submission, improving their overall experience and reducing frustration.

### 2. Example of How to Modify an Attribute Value Using DOM.

Here's an example of how to modify the `src` attribute of an `<img>` tag using JavaScript and the DOM:

#### HTML:

```
  
<button onclick="changeImage()">Change Image</button>
```

#### JavaScript:

```
function changeImage() {  
    document.getElementById('myImage').src = 'new-image.jpg';  
}
```

In this example, clicking the button will change the `src` attribute of the image with `id="myImage"` from `old-image.jpg` to `new-image.jpg`.

### 3. What is jQuery AJAX?

jQuery AJAX is a method provided by the jQuery library for making asynchronous HTTP requests. AJAX (Asynchronous JavaScript and XML) allows web pages to be updated asynchronously by exchanging small amounts of data with the server behind the scenes. This means that web pages can be updated dynamically without reloading the entire page.

#### Example of jQuery AJAX:

```
$.ajax({  
    url: 'https://api.example.com/data',  
    method: 'GET',  
    success: function(data) {  
        console.log('Data received:', data);  
    },  
    error: function(error) {
```

```
        console.error('Error:', error);  
    }  
});
```

### Problem Statement:

Write a program to design Student registration form by using HTML, CSS having following fields: Username, Email, Phone number, Password, Confirm Password and write external javascript code to achieve following validations

- Fields should not be empty. If spaces are entered those should be considered empty
- Phone number must accept only numeric values and it should be 10 digits
- Password length must be at least 7 and it should contain at least one capital letter, one digit and one special character from the set (&,\$,#,@)
- Value entered in password field and confirm password fields must match

Email address must contain @ sign and a ., there should be few letters before the @ sign, there should be three letters between @ sign and a . There must be 3 or 2 letters after the . (hint: Use regular expression)

Write a client-side script with JavaScript to access and manipulate Document Object Model (DOM) objects in an HTML web page. Develop a dynamic web page using javascript and DOM. Make use of the following for accessing elements

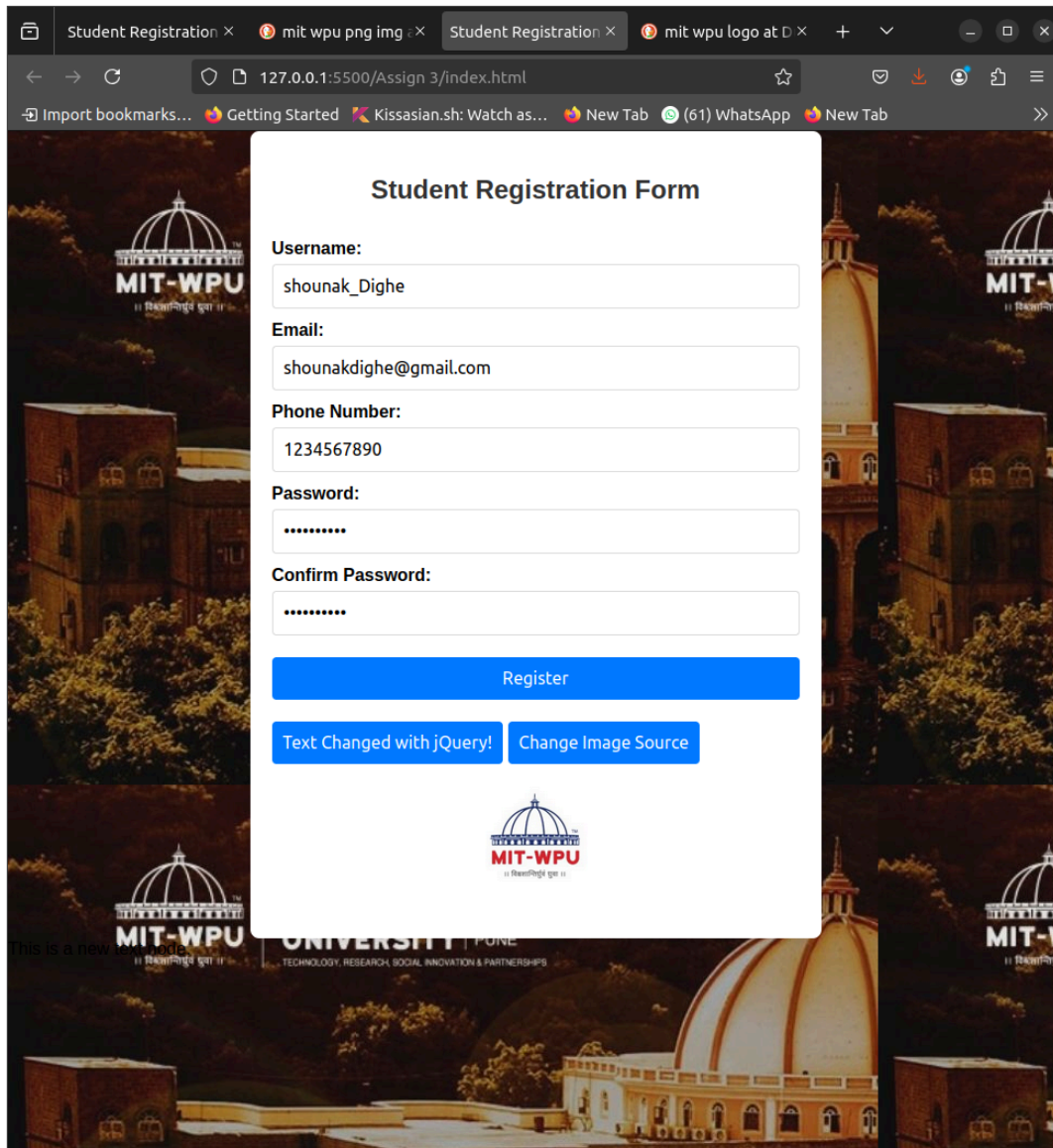
- getElementById, getElementsByTagName, getElementsByClassName
- Change the text using innerHTML property
- Change the CSS properties like color, position of a particular element on the page
- Change the image source after clicking on a button
- Add a text node and attach it to a parent node
- Delete a node

Include jQuery to perform following operations:

- Change button text using jQuery.
- Set background-image using jQuery CSS property.
- Access HTML form data using jQuery.
- Add attribute using jQuery

Use this reference link for jQuery :

<https://www.w3resource.com/jquery-exercises/part1/index.php>



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### Student Registration Form

**Username:**

**Email:**


**Phone Number:**

**Password:**

**Confirm Password:**

[Register](#)

[Text Changed with jQuery!](#) [Change Image Source](#)



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Student Registration Form


Username:

Email:

Phone Number:

Password:

Confirm Password:



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Student Registration Form

Username:  
shounak\_Dighe

Email:  
shounakdighe@gmail.com

Phone Number:  
1234567890

Password:  
.....

127.0.0.1:5500  
Form submitted successfully!  
☐ Don't allow 127.0.0.1:5500 to prompt you again  
OK

Change Button Text | Change Image Source

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### Student Registration Form

**Username:**


**Email:**

**Phone Number:**

**Password:**

🌐 127.0.0.1:5500  
Form submitted successfully!  
**OK**

[Change Button Text](#) [Change Image Source](#)



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index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Student Registration Form</title>
  <link rel="stylesheet" href="styles.css">
  <script src="https://code.jquery.com/jquery-3.6.0.min.js"></script>
</head>
<body>
  <div class="container">
    <h2>Student Registration Form</h2>
    <form id="registrationForm">
      <label for="username">Username:</label>
      <input type="text" id="username" name="username" required>

      <label for="email">Email:</label>
      <input type="email" id="email" name="email" required>

      <label for="phone">Phone Number:</label>
      <input type="text" id="phone" name="phone" required>

      <label for="password">Password:</label>
      <input type="password" id="password" name="password" required>

      <label for="confirmPassword">Confirm Password:</label>
      <input type="password" id="confirmPassword"
name="confirmPassword" required>

      <button type="submit">Register</button>
    </form>
    <button id="changeTextButton">Change Button Text</button>
    <button id="changeImageButton">Change Image Source</button>
    
  </div>

  <script src="script.js"></script>
  <script src="jquery-script.js"></script>
```

```
</body>  
</html>
```

## styles.css

```
/* External CSS */  
body {  
    font-family: Arial, sans-serif;  
    background-color: #f4f4f4;  
    margin: 0;  
    padding: 0;  
}  
  
.container {  
    width: 50%;  
    margin: auto;  
    padding: 20px;  
    background: #fff;  
    border-radius: 8px;  
    box-shadow: 0 0 10px rgba(0,0,0,0.1);  
}  
  
h2 {  
    text-align: center;  
    color: #333;  
}  
  
form {  
    display: flex;  
    flex-direction: column;  
}  
  
label {  
    margin-top: 10px;  
    font-weight: bold;  
}  
  
input {  
    margin-top: 5px;
```

```
padding: 10px;
font-size: 16px;
border: 1px solid #ddd;
border-radius: 4px;
}

button {
margin-top: 20px;
padding: 10px;
font-size: 16px;
border: none;
border-radius: 4px;
background-color: #007bff;
color: white;
cursor: pointer;
}

button:hover {
background-color: #0056b3;
}

#dynamicImage {
display: block;
margin: 20px auto;
width: 100px;
height: 100px;
}
```

script.js

```
// JavaScript for Form Validation
document.getElementById('registrationForm').addEventListener('submit',
function(event) {
    event.preventDefault(); // Prevent form submission for validation

    // Retrieve values
    var username = document.getElementById('username').value.trim();
    var email = document.getElementById('email').value.trim();
    var phone = document.getElementById('phone').value.trim();
```

```
var password = document.getElementById('password').value;
var confirmPassword = document.getElementById('confirmPassword').value;

// Validate fields
if (username === '' || email === '' || phone === '' || password === '' || confirmPassword === '') {
    alert('All fields are required.');
```

```
    return;
}

// Validate phone number
if (!/^\\d{10}$/.test(phone)) {
    alert('Phone number must be 10 digits.');
```

```
    return;
}

// Validate password
if (!/(?=.*[A-Z])(?=.*\\d)(?=.*[@$#&]).{7,}/.test(password)) {
    alert('Password must be at least 7 characters long and include one capital letter, one digit, and one special character from (&, $, #, @).');
```

```
    return;
}

// Validate confirm password
if (password !== confirmPassword) {
    alert('Passwords do not match.');
```

```
    return;
}

// Validate email
if (!/^\\^[^\\s@]+@[^\\s@]+\\. [a-zA-Z]{2,3}$/.test(email)) {
    alert('Invalid email address.');
```

```
    return;
}

alert('Form submitted successfully!');
});

// JavaScript for DOM Manipulation
document.getElementById('changeImageButton').addEventListener('click',
function() {
    document.getElementById('dynamicImage').src = 'new-image.jpg';
});
```

```
});  
  
document.getElementById('changeTextButton').addEventListener('click',  
function() {  
    this.textContent = 'Text Changed!';  
});  
  
function addTextNode() {  
    var newNode = document.createTextNode('This is a new text node.');    document.body.appendChild(newNode);  
}  
  
// Add a text node  
addTextNode();  
  
// Delete an element  
function deleteNode() {  
    var element = document.getElementById('dynamicImage');  
    if (element) {  
        element.remove();  
    }  
}
```

jquery-script.js

```
$(document).ready(function() {  
    // Change button text using jQuery  
    $('#changeTextButton').click(function() {  
        $(this).text('Text Changed with jQuery!');  
    });  
  
    // Set background-image using jQuery CSS property  
    $('body').css('background-image', 'url("background.jpg")');  
    // Access HTML form data using jQuery  
    $('#registrationForm').submit(function(event) {  
        event.preventDefault(); // Prevent form submission for validation  
  
        var username = $('#username').val().trim();
```



```
var email = $('#email').val().trim();
var phone = $('#phone').val().trim();
var password = $('#password').val();
var confirmPassword = $('#confirmPassword').val();

// Validate fields
if (username === '' || email === '' || phone === '' || password ===
'' || confirmPassword === '') {
    alert('All fields are required.');
```

```
    return;
}

// Validate phone number
if (!/^\d{10}$/.test(phone)) {
    alert('Phone number must be 10 digits.');
```

```
    return;
}

// Validate password
if (!/(?=.*[A-Z])(?=.*\d)(?=.*[@$#&]).{7,}/.test(password)) {
    alert('Password must be at least 7 characters long and include
one capital letter, one digit, and one special character from (&, $, #,
@).');
```

```
    return;
}

// Validate confirm password
if (password !== confirmPassword) {
    alert('Passwords do not match.');
```

```
    return;
}

// Validate email
if (!/^[^\s@]+@[^\s@]+\.[a-zA-Z]{2,3}$/.test(email)) {
    alert('Invalid email address.');
```

```
    return;
}

alert('Form submitted successfully!');
});

// Add attribute using jQuery
```



Dr. Vishwanath Karad

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School of Computer Engineering & Technology  
Class: Third Year B.Tech CSE (Trimester VIII)  
Course: Web Technologies

```
$('#dynamicImage').attr('alt', 'Updated Dynamic Image');  
});
```